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**Licensed Building Professional Guidance  
to the  
ENERGY STAR® Label for Buildings**



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## 1. Introduction

The United States Environmental Protection Agency (EPA) and the U.S. Department of Energy (DOE) have established the ENERGY STAR Label for Buildings to enable benchmarking of commercial building energy consumption on a 0 to 100 scale. Buildings that are among the top 25 percent nationwide in energy performance, equal to a benchmarking score of 75 or greater, and maintain an indoor environment that conforms to industry standards can qualify for designation as an ENERGY STAR Building. ENERGY STAR Label for Buildings is comprised of three important components that can provide building owners, property managers, and facility managers with a consistent way to establish, assess, document, and communicate energy performance in a national context: 1) the ENERGY STAR Benchmarking Tool; 2) the Statement of Energy Performance; and 3) the ENERGY STAR Label plaque.

The Benchmarking Tool is an on-line interactive software tool that evaluates the energy performance of a building against similar-use buildings in the United States. This comparison is made by accounting for those drivers of energy use that cannot be controlled, such as location and weather, as well as those that are a reflection of the building's business activity, such as occupant density, hours of occupancy, and building space use. Use of the Tool does not require a detailed building simulation or building operating knowledge; rather it simply requires entering basic information of the building's energy consumption, operating characteristics, and physical attributes.

Documenting the results of the Benchmarking Tool is the Statement of Energy Performance, a stand-alone document designed to readily communicate a building's benchmarking results, energy consumption (both actual and weather normalized), operating characteristics, physical attributes, and a statement of conformance to indoor environmental standards. All that is needed to apply for the ENERGY STAR Label are a Statement of Energy Performance validated by a Licensed Building Professional, showing that the ENERGY STAR criteria have been met, and a one-page agreement letter. The Statement of Energy Performance, as part of the building's documentation, should also be used to provide valuable input into business transactions involving buying, selling, appraising, leasing, and insuring the building, as well as contracting for energy, operations, and maintenance services.



**STATEMENT OF ENERGY PERFORMANCE**  
**Research Tower 4/6/1999**

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**Building**  
 Research Tower  
 2277 Research Blvd  
 Rockville, MD 20850  
 Gross Building Area (ft<sup>2</sup>): 139,000  
 Year Built: 1972

**Building Owner**  
 Eastern Management  
 2277 Research Blvd, Suite 202  
 Rockville, MD 20850  
 Contact Name: Fred Jones  
 Contact Phone: 301-519-8999

**Building Space Use Summary**

	Area (ft <sup>2</sup> )	Occupants	Operation Hours/Week	Computers
Office:	137,000	650	50	650
Computer Room/Data Center:	2,000	-	84	-


**Site Energy Use Summary (1/21/98 to 1/21/99)**

Electricity (kWh)	Total Energy (kBtu)
7,441,572	7,441,572

**Normalized Benchmark Data**

	ENERGY STAR	Your Building
<b>Benchmarking Score:</b>	75	90
<b>Energy Intensity:</b>		
Site (kBtu/ft <sup>2</sup> -yr):	53	47
Source (kBtu/ft <sup>2</sup> -yr):	159	141
<b>Pollutants:</b>		
CO <sub>2</sub> (lbs/yr):	10,830,785	11,955,946
SO <sub>2</sub> (lbs/yr):	121,906	134,570
NO <sub>x</sub> (lbs/yr):	35,882	39,609
<b>Energy Cost:</b>		
(\$):	229,004	203,510
(\$/ft <sup>2</sup> -yr):	1.65	1.46

**Professional Verification**  
 Jane Smith, Professional Engineer  
 Engineering Services of Maryland  
 2275 Research Blvd  
 Suite 200  
 Rockville, MD 20850  
 301-519-8888



Professional Engineer Smith  
 Based on the conditions observed at the time of my visit to  
 this building, I certify that this statement is accurate.

**Indoor Environment Criteria**

INDOOR AIR POLLUTANTS CONTROLLED?	PASS
ADEQUATE VENTILATION PROVIDED?	PASS
THERMAL CONDITIONS MET?	PASS
ADEQUATE ILLUMINATION PROVIDED?	PASS

**Statement of Energy Performance**  
*Example of a Validated Statement of Energy Performance*

Buildings documented on the Statement of Energy Performance as conforming to industry standards for indoor environment and that score a 75 or greater on the Benchmarking Tool are eligible to receive the ENERGY STAR Label plaque and to be placed in the *Registry of ENERGY STAR Buildings* located on the ENERGY STAR Label for Buildings web site. This national recognition symbolizes the building owner's commitment to the health of its business, its building's occupants, and the environment.

## **2. Role of the Licensed Professional**

Licensed building professionals, currently limited to licensed Professional Engineers (PEs), play a pivotal role in validating the Statement of Energy Performance. PEs have an established role in ensuring that building owners receive unbiased engineering services and have a professional duty to protect public health and safety. Those PEs who are licensed in commercial building systems disciplines such as mechanical, electrical, energy, and architectural engineering have demonstrated the experience, expertise, and professionalism needed to properly evaluate commercial buildings and thus validate the Statement of Energy Performance.

In general, to properly validate the ENERGY STAR Statement of Energy Performance, a PE should have all of the following qualifications:

- A license to practice in the state where the building is located, or a reciprocal agreement to practice in that state. Exception: Professional engineers employed by the federal government may evaluate any buildings which are Federally-owned or primarily occupied by the Federal government. Contractors and consultants to the federal government, however, are not covered by this exemption.
- Engineering degree, such as mechanical, electrical, architectural, or building-systems
- Experience in commercial property assessment or building energy analysis
- Working knowledge of the Illuminating Engineering Society of North America (IESNA) Lighting Handbook, American Society of Heating Refrigeration and Air-Conditioning Engineers (ASHRAE) Standard 55-1992, and ASHRAE Standard 62-1989

## **3. Duties and Responsibilities of the PE**

The primary responsibilities of the PE to ENERGY STAR Label for Buildings include verifying a building's 1) physical attributes, 2) operating characteristics, 3) energy consumption, and 4) conformance to industry standards for indoor environment. While not required as part of generating an official Statement of Energy Performance,

PEs also may be retained to collect the basic building data, enter the data into the Benchmarking Tool, and submit the application for the ENERGY STAR Label. Their duties and responsibilities will thus depend on the nature of the professional services that they provide, based upon the contractual relationship with the building owner or client. Other services provided by the PE on behalf of the building owner could add to these responsibilities. Therefore, it is recommended that a carefully worded scope of work in the contract be agreed upon by both the building owner and the PE. Regardless of the agreed-upon level of effort, for the purposes of generating and validating a Statement of Energy Performance, the PE must verify the aforementioned site conditions.

### **3.1 Limitation of Liability for On-site Conditions**

The legal requirements that guide a PE in the conduct and reporting of building environmental conditions are numerous and beyond the scope of this document. Knowledge of state and federal statutes and relevant court rulings that would pertain to the conduct of professional services should be reviewed with an experienced legal counsel. An understanding of the contractual obligation to provide the indoor assessment for the Label, relative to survey and inspection services that would be conducted using the “Hazardous Materials” definitions accepted by CERCLA, should be clearly listed in writing in the contract between the PE and the owner.

### **3.2 Overview**

#### *Basic Building Data*

In general, the basic building data that is required to be entered into the Benchmarking Tool, and thus verified by a PE, includes the following:

- Physical attributes
- Operating characteristics
- Energy consumption

A detailed explanation delineating the requirements of each of these subject areas is provided in Section 5 - Verifying Site Conditions.

#### *Indoor Environment*

The indoor environment of the building must be verified by a PE as meeting industry standards for ambient lighting levels, thermal comfort, ventilation, and control of indoor air pollutants. The current applicable standards are:

- Lighting Levels: IESNA *Lighting Handbook: Reference & Application*, 9<sup>th</sup> Edition, 1999.

- Thermal Comfort: ANSI/ASHRAE Standard 55-1992 *Thermal Environmental Conditions for Human Occupancy*
- Ventilation and Control of Indoor Air Pollutants: ANSI/ASHRAE Standard 62-1989 *Ventilation for Acceptable Indoor Air Quality*

A detailed explanation of the requirements for conformance to each of these industry standards is provided in Section 5.4. – Indoor Environment.

**Note:** The PE is providing his/her professional opinion as to whether the operating parameters of the building are consistent with industry standards for indoor environment based on the conditions observed at the time of the visit. Assessing conformance to industry standards for indoor environment is NOT intended, nor should it be represented, as an indoor air quality survey, an indoor environmental inspection, or an official statement of building indoor air quality at the time of the visit. Furthermore, the opinion of the PE should not be construed as a stated or implicit guarantee of current or future indoor air quality.

#### **4. Site Visit Preparation**

Prior to a site visit, the PE should become familiar with the requirements of the Benchmarking Tool and industry standards for indoor environment. Information regarding the Benchmarking Tool is available on-line at the ENERGY STAR Label for Buildings web site ([www.epa.gov/buildinglabel](http://www.epa.gov/buildinglabel)). Links to the indoor environment standards also can be found at this site. For a more detailed explanation regarding the development of the Benchmarking Tool and ENERGY STAR performance targets, a document entitled *Technical Description* can be downloaded from the web site using Adobe Acrobat™.

To best utilize the time of the PE during the site visit, the information listed below should be requested of the building owner or property manager.

##### *Physical Attributes*

- Building location, including street address and ZIP code
- Year of building construction
- Total gross building area (ft<sup>2</sup>)
- Number and associated gross area of each unique functional space use within building (i.e., office, K-12, garage, and computer rooms)

##### *Operating Characteristics*

- Weekly hours of occupancy
- Number of full-time building occupants
- Number of personal computers in operation
- Average annual vacancy rate over the past 12 months
- Number of months in the preceding 12 months building has been in operation

##### *Energy Consumption*

- Monthly energy consumption for each source of energy covering the most recent 12 months

- Consumption dates (i.e., billing dates) for each month

*Optional*

- Electrical demand (kW) information covering the most recent 12 months
- Energy costs for each source of energy covering the most recent 12 months

Excluding the Optional Information, all the data listed above is required to benchmark a building's energy performance using the ENERGY STAR Benchmarking Tool. Although it is not required that a PE enter this data, it is the responsibility of the PE to verify the accuracy of the data entered. Thus, it may be an advantageous use of resources to have the PE review the actual data entry record completed by the building owner or property manager.

## **5. Verification of Site Conditions**

To accurately benchmark a building, the Benchmarking Tool requires information on the building's physical attributes, operating characteristics, and energy consumption. In addition to verifying the accuracy of this information, the PE will need to confirm that minimum eligibility criteria are met for certain information. In making this assessment, the following information may be useful to review:

- "As-builts" and/or original construction drawings
- Monthly utility bills for each source of energy
- Energy Management Control System (EMCS) or Direct Digital Control (DDC) monthly output of energy use
- Occupancy schedules
- Building LAN manager(s) contact information (useful in verifying the number of personal computers in operation)
- Date and extent of most recent changes to building (e.g., energy-efficiency upgrades, addition of new space, changes in occupant density, vacancy rate changes)

Before verifying the building's indoor environment, the PE should request the following information from the building owner or property manager:

- Most recent Testing, Adjusting, and Balancing (TAB) report, if available
- Most recent documentation of indoor air quality survey, if available
- Keys to all mechanical and electrical rooms
- Smoking policy documentation
- Written preventative maintenance plan



## 5.1 Physical Attributes

The PE is required to verify the accuracy and confirm the eligibility (where applicable) of the following physical attributes of the building:

- Building size. Building must be at least 5,000 gross square feet.
- Building name
- Building street address, city, state, and ZIP code
- Year of completion of initial construction

The screenshot shows the 'BENCHMARKING TOOL' interface. At the top, there is a navigation bar with buttons for INVENTORY MANAGER, BASIC BUILDING DATA (selected), SPACE USE DATA, METER DATA, BENCHMARK RESULTS, CONTACT INFORMATION, LICENSED PROFESSIONAL INFORMATION, STATEMENT OF ENERGY PERFORMANCE, and LABEL APPLICATION. Below this is a secondary bar with HELP, HOME, EMAIL, and INSTRUCTIONS. The main content area is titled 'Basic Building Data' and contains the following fields:

Building Name:	Building A - Research	
Building Street Address:	2275 Main Blvd	
City:	Gaithersburg	
State:	Maryland	
Zip Code:	20850	
Year Built:	1980	(YYYY Format, Please)
What is your average annual vacancy rate?	1	(%)
How many of the last 12 months was the building occupied?	12	Months

At the bottom of the form are two buttons: 'Save & Continue' and 'Exit Tool'.

**Basic Building Data**  
*Example of a Completed Basic Building Data Entry*

## 5.2 Operating Characteristics

For purposes of evaluating a building, the Benchmarking Tool requires that the building's gross square footage be classified as either primary or secondary space. Primary Space is the primary function of a building for which a benchmark can be generated. This is currently limited to office space and K-12 schools. Secondary Space is a secondary function of a building, or space that supports the function of the primary space. Currently, Secondary Spaces are limited to

Computer Room/Data Centers, Ventilated Parking Garages, Unventilated Parking Garages, and Parking Lots.

<b><i>Primary Space Uses</i></b>	<b><i>Secondary Space Uses</i></b>
Office K-12 School	Computer Room/Data Center Parking Garage Parking Lot

Table 1 - Current Allowable Space Uses

Buildings that contain Secondary Space other than those listed in Table 1 (i.e., retail, restaurant, convenience store, etc.) are unable to be benchmarked and, thus, cannot apply for the ENERGY STAR Label unless the following conditions are met:

- 1) Space is sub-metered for all energy sources.
- 2) Office space is equal to 50 percent or more of total building gross square footage.

Note that typical minority area spaces which support the functions of the primary space and its occupants (equipment and mechanical rooms, storage rooms, copy rooms, lobbies, restrooms, break rooms, cafeterias, and exercise facilities) may be considered part of the Primary Space.

The PE is required to verify the accuracy and confirm the eligibility of the following operating characteristics of the building:

**Gross floor area** for all Primary Spaces (i.e., office space, K-12) and Secondary Spaces (i.e., garage, parking lot, computer room, or data center).

A building must contain at least 50 percent of gross square footage designated as Primary Space use. Also, no more than 10 percent of gross square footage can be designated as Computer Room/Data Center space.

**Operation** for each Primary and Secondary Space for the period of data entry

#### Offices

- Must have been occupied for at least 11 of the 12 months.
- Must have been occupied and in use at least 30 hours per week.
- The average annual vacancy rate must not have exceeded 20 percent.

#### K-12 Schools

- Must have been occupied for at least 9 of the last 12 months
- Must have been occupied and in use at least 35 hours per week

Parking Lot

Operation may not have exceeded 84 hours per week

**Occupancy** for the period of data entry

Offices

Occupant Density must be between 0.3 and 10.0 persons per 1,000 square feet

Number of personal computers

The screenshot displays the 'BENCHMARKING TOOL' web application. At the top, there is a navigation bar with buttons for 'INVENTORY MANAGER', 'BASIC BUILDING DATA', 'SPACE USE DATA', 'METER DATA', 'BENCHMARK RESULTS', 'CONTACT INFORMATION', 'LICENSED PROFESSIONAL INFORMATION', 'STATEMENT OF ENERGY PERFORMANCE', and 'LABEL APPLICATION'. Below this is a secondary navigation bar with 'HELP', 'HOME', 'EMAIL', and 'INSTRUCTIONS'. The main content area is titled 'Building Space Use Data' and shows details for 'Building B - Management' at '166 Main Street, Gaithersburg, MD 20850'. A 'Building Space Use Summary' table lists various space types with input fields for area, occupancy, and occupants. Below the table is an 'Add Spaces' section with a dropdown menu and an 'Add Space' button.

Type of Space	Gross Space Use Area (ft <sup>2</sup> )	Weekly Occupancy Hours	Number of Occupants	Number of PC's	Delete Space
Primary-Office #1	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
Secondary-Computer Data Center #1	<input type="text"/>	<input type="text"/>	N/A	N/A	<input type="button" value="Delete"/>
Secondary-Ventilated Parking Garage #1	<input type="text"/>	<input type="text"/>	N/A	N/A	<input type="button" value="Delete"/>
Secondary-Unventilated Parking Garage #1	<input type="text"/>	<input type="text"/>	N/A	N/A	<input type="button" value="Delete"/>
Secondary-Open Parking Facility #1	<input type="text"/>	<input type="text"/>	N/A	N/A	<input type="button" value="Delete"/>

Add Spaces:

Select Type of Space to add:

**Building Space Use Data**  
*Example of a Building Space Use Screen*

### 5.3 Energy Consumption

The Benchmarking Tool allows meter entries for electricity, natural gas, fuel oil, district steam, district chilled water, propane, liquid propane, and wood. Multiple meter entries for individual fuel types (e.g., electricity) are acceptable up to a maximum of 100 sub-meters per fuel type. All sources of energy used within the building and all sub-meters must be entered into the Benchmarking Tool. It is the responsibility of the PE to verify that the energy consumption information was entered into the Benchmarking Tool correctly and includes the following:

- At least 10 energy consumption data entries for each source of energy and all sub-meters covering a period of 365 days +/- 45 days.

**Exceptions:** All information for Parking Garages that are not attached to the main building structure and are sub-metered are not to be entered into the Benchmarking Tool. Likewise, data for Parking Lots supporting the main building structure that are sub-metered are not to be entered into the Benchmarking Tool.

**Note:** For fuel oil only, the Benchmarking Tool allows an estimation of monthly oil consumption, with a minimum of six data entries required (entries of "0" are acceptable).

- Contiguous Start and End dates of each billing period. The total energy consumption for each fuel must encompass a time period in which the total range of meter entries from the first to the last meter date is at most 410 consecutive days and at least 315 days.
- Optional: the meter identifier, total annual cost for each source of energy, and monthly electric demand

**BENCHMARKING TOOL**

INVENTORY MANAGER BASIC BUILDING DATA SPACE USE DATA METER DATA BENCHMARK RESULTS CONTACT INFORMATION LICENSED PROFESSIONAL INFORMATION STATEMENT OF ENERGY PERFORMANCE LABEL APPLICATION

HELP HOME EMAIL INSTRUCTIONS

**Meter Data Summary (Add Meters)**

Building B - Management  
166 Main Street  
Gaithersburg, MD 20850

**Building Meter Summary:**

	Energy Source	Meter ID	Annual Consumption	Energy Unit	Data Complete?	Edit this Meter's Data
1	Electric		0.0		No	<a href="#">Edit Meter</a>
2	Oil		0.0		No	<a href="#">Edit Tank</a>
3	Gas		0.0		No	<a href="#">Edit Meter</a>
4	Steam		0.0		No	<a href="#">Edit Meter</a>
5	District Chilled Water		0.0		No	<a href="#">Edit Meter</a>
6	Propane		0.0		No	<a href="#">Edit Meter</a>

**Add New Meter:**

Please select the **Energy Source** of the Meter to be added:  [Add Meter](#)

[Save & Continue](#) [Exit Tool](#)

**Meter Data Summary**  
*Example of a Meter Data Summary Screen*

## 5.4 Indoor Environment

Verifying the building's indoor environment will require the PE to perform a visual walk-through inspection of the building spaces and HVAC system. The PE is also expected to take measurements of various building systems to ensure that their operation is consistent with current industry standards. The purpose of this evaluation is to confirm that the building is operating in a manner that is consistent with contemporary standards and, in so doing, provides a healthy and productive indoor environment for all occupants. This evaluation is only intended to convey the PE's opinion, based on their professional judgment and experience, on conformance to the ENERGY STAR Label for Buildings' indoor environment requirements, which are based on current industry standards. In developing an opinion, the PE will likely be required to take field measurements and perform calculations. This evaluation is neither an indoor air quality survey nor a facility inspection for code compliance or presence of hazardous materials. The PE performing the site visit of the building is required to render a pass/fail opinion in the following four areas:

1. Indoor air pollutants properly controlled
2. Adequate outside air ventilation provided
3. Interior thermal conditions provided

#### 4. Adequate illumination provided

**Note:** In rendering a professional opinion regarding conformance to the ENERGY STAR Label's indoor environment requirements, the PE may need to take field measurements and perform engineering calculations. Reviewing dated indoor air quality reports, testing, adjusting, and balancing reports, and lighting surveys is generally not acceptable for this purpose.

**BENCHMARKING TOOL**

INVENTORY MANAGER BASIC BUILDING DATA SPACE USE DATA METER DATA BENCHMARK RESULTS CONTACT INFORMATION LICENSED PROFESSIONAL INFORMATION STATEMENT OF ENERGY PERFORMANCE LABEL APPLICATION

HELP HOME EMAIL INSTRUCTIONS

**Licensed Building Professional Information**  
(Note: at present, only Professional Engineers are permitted to evaluate nominated buildings)

**Building B - Management**  
166 Main Street  
Gaithersburg, MD 20850

**1. On-Site Observation Period:**

From (MM/DD/YYYY) To (MM/DD/YYYY)  
Date Range:    
Total Hours:

**2. Licensed Building Professional's Observations:**

Indoor Air Pollutants Controlled?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> Not Assessed
Adequate Ventilation Provided?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> Not Assessed
Thermal Conditions Met?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> Not Assessed
Adequate Illumination Provided?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> Not Assessed
The Building's annual average vacancy rate no more than <b>20%</b> during the metered period?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> Not Assessed
The Building's mechanical & electrical systems were in operation at least <b>11</b> of the last 12 metered months?	<input type="radio"/> Yes	<input type="radio"/> No	<input checked="" type="radio"/> Not Assessed

### Indoor Environment

#### *Example of Indoor Environment Assessment by a Building Professional*

##### 5.4.1 Control of Indoor Air Pollutants

Each of the following space uses require: **direct exhaust** of the room/source air to the outdoors with proper placement of exhaust to minimize occupant exposure; **negative pressure** relative to occupied spaces; and chemical/source containers fully sealed.

- Printing facilities or large copy rooms
- Cooking facilities
- Smoking lounges (60 cubic feet per minute (CFM)/person outside air makeup)

- Enclosed garages (1.5 CFM/SF outside air makeup)
- Chemical storage rooms/facilities (e.g., spaces that store housekeeping supplies, pesticides, paints, lubricants, adhesives)
- Rest rooms or bathrooms
- Repair shops/machine rooms or mechanical rooms
- Laboratories
- Dry cleaning facilities
- Hair/nail salons

The PE also must verify conformance to the following requirements:

- A written **smoking policy** that prevents involuntary exposure to secondhand smoke by either prohibiting smoking throughout the building or restricting smoking to areas that are separately ventilated, maintained under negative pressure, and directly exhausted to the outside as recommended in ASHRAE Standard 62-1989. See Section 4.4.2 - Supply of Outdoor Air for acceptable supply ventilation rates.
- A written **preventative maintenance plan**. The PE is required to examine the building documentation for a written maintenance schedule that includes monitoring, inspecting, and cleaning of all HVAC components for proper operation to ensure high-quality ventilation air. If a written plan is not present, the PE is required to suggest that one be considered. Details for setting up and implementing a preventative maintenance program in office buildings can be found in:

*Building Air Quality: A Guide for Building Owners and Facility Managers* (EPA/400/1-91/033, DHHS (NIOSH Pub. No. 91-114)), and *Building Air Quality Action Plan* (EPA 402-K-98-001, DHHS (NIOSH Pub. No. 98-123)).

For schools this information can be found in *Indoor Air Quality Tools for Schools Kit* (EPA 402-K-95-001).

These documents may be found at <http://www.epa.gov/iaq/>

- The building should be free of **microbiological sources** (i.e., visible microbial growth on walls, ceilings, flooring, or HVAC components) as indicated by no stained ceiling tiles, wet carpets, or other porous materials, no musty odors, or no standing water. Air handling unit condensate drain pans should be clean, properly sloped, and protected from microbial contamination. HVAC components downstream of water sprays must be clean. Cooling towers must be adequately treated and protected from microbial contamination.
- **Combustion sources** such as furnaces shall be exhausted directly to the outside and shall be assured of no back draft.

- **Outdoor air intakes** should be visually determined to be adequately protected from outdoor pollutant sources, such as cooling tower exhaust, street traffic, trash storage, and building exhaust from same or adjacent buildings.
- **Air filters** should be 40 percent efficient or greater, as tested using the Atmospheric Dust Spot Efficiency test (ANSI/ASHRAE Standard 52.1-1992, "Gravimetric and Dust Spot Procedures for Testing Air Cleaning Devices used in General Ventilation for Removing Particulate Matter").

**Note:** In developing an opinion of a building's conformance to air filtration requirements during the site visit, the PE shall examine a representative sampling of the air handling units. Filters are typically labeled as to their rating under this efficiency test, although in some cases the filter may have to be removed in order to note the rating). In general, electronic filters and HEPA filters will be rated at above 40 percent efficient using this test, while non-pleated, panel filters will have ratings lower than 40 percent. Pleated and bag-type filters should be examined carefully as certain models will be rated at above 40 percent efficient while others will not.

#### 5.4.2 Supply of Outdoor Air

Per ASHRAE Standard 62-1989, the supply rates of outdoor air required for acceptable indoor air quality are as follows:

- Office Space: 20 cubic feet per minute (CFM) per person
- Classrooms: 15 CFM/person
- Laboratories: 20 CFM/person
- Auditoriums: 15 CFM/person
- Libraries: 15 CFM/person
- Cafeterias: 20 CFM/person
- Locker Rooms: 0.50 CFM/ft<sup>2</sup>
- Computer Rooms/Data Entry Space: 20 CFM/person
- Parking Garages: 1.5 CFM/ft<sup>2</sup>
- Smoking Lounge: 60 CFM/person with local exhaust and no recirculation

**Note:** These supply rates shall be met by each air-handling unit evaluated. The PE should make every effort to measure outdoor air flow directly. If this is not feasible due to air-handling unit design or otherwise, the PE should estimate the percentage of outdoor air by mass balance equations. In the case of smoking lounges, for example, this might be more easily accomplished by measuring the air flow at the exhaust.

In rendering a professional opinion regarding conformance to the ENERGY STAR Label's requirements for the supply of outdoor air, the PE may need to take field measurements and perform engineering calculations. Reviewing dated indoor air quality reports and testing, adjusting, and balancing reports is generally not acceptable for this purpose.



### 5.4.3 Thermal Comfort

Per ASHRAE Standard 55-1992, the acceptable thermal environment of indoor spaces designed for human occupancy is dependent upon operating temperature and relative humidity. The effectiveness of the building at providing the specified thermal environmental conditions is dependent upon on the outdoor air temperatures, simplified here to heating (i.e., winter) and cooling (i.e., summer) modes. At the time of the site visit, the PE should note whether the HVAC system is in a heating or cooling mode prior to rendering an opinion on conformance to acceptable thermal conditions. The acceptable thermal environment conditions during heating and cooling modes are as follows:

- Heating (e.g., winter)  
Dry-Bulb Temperature Range: 68° F to 74° F  
Relative Humidity Range: 30% to 60%
- Cooling (e.g., summer)  
Dry-Bulb Temperature Range: 73° F to 79° F  
Relative Humidity Range: 30% to 60%

**Note:** In rendering a professional opinion regarding conformance to the ENERGY STAR Label's thermal comfort requirements, the PE may need measure the temperature and humidity of a representative sampling of the building's occupied spaces. Reviewing dated indoor air quality reports, testing, adjusting, and balancing reports, and lighting surveys is generally not acceptable for this purpose.

In addition to randomly sampling the occupied spaces in building, the PE should also make every effort to perform a walk-through inspection of occupied areas with observed signs of occupant discomfort related to the thermal conditions, such as:

- Oscillating table fans, window fans, or personal fans
- Personal space heaters
- Open windows
- Window or through-the-wall room air-conditioners
- Covered or modified supply air diffusers

**Note:** It is the responsibility of the PE to decide, in his/her professional opinion, whether the building meets the letter and spirit of the standard considering all the data collected and observations made.

#### 5.4.4 Illumination Levels

The PE shall measure the illumination levels in a random sampling of spaces, both occupied (e.g., office space) and generally unoccupied (e.g., parking facilities and service spaces). Per the Illuminance Selection Procedure in the *IESNA Lighting Handbook*, a sample of the minimum recommended, maintained illumination levels are provided in the table below (in footcandles):

Interior Location	Horizontal	Vertical
Private Offices	50	5
Open Plan Office		
Intensive VDT use	30	5
Intermittent VDT use	50	5
Lobbies/Reception	10	3
Stairways and corridors	10	-
Restrooms	5	3
Educational		
Reading – chalk boards	-	50
Reading – pen/typed print	30	-
Reading - #2 handwritten pencil	30	-
Reading - #4 handwritten pencil	100	-
Science labs	50	30
Parking Facilities	Horizontal	Vertical
Covered Parking Garages <sup>1</sup>		
Basic	1	0.5
Ramps	2/1 (day/night)	1/0.5(day/night)
Entrance areas	50/1 (day/night)	25/0.5 (day/night)
Stairways	2	1
Open Parking Facilities <sup>2</sup>	0.2	0.1

<sup>1</sup>uniformity ratio (max:min) of 10:1 recommended

<sup>2</sup>uniformity ratio (max:min) of 20:1 recommended

**Note:** Illumination values provided in the table above represent the average illumination provided in a functional space (i.e., each individual light fixture is not required to meet these illumination levels on an individual basis, but rather on average). Additional illuminance recommendations and selection procedures are detailed in *IESNA Lighting Handbook*.

## 6. Application Process

Applying for award of the ENERGY STAR Label for Building requires:

1. Achieving a Benchmark Score of 75 or higher.
2. Demonstrating compliance with industry standards for indoor environment.
3. Nominating the building through a Letter of Agreement.

In order to be benchmarked, a building and its operations must first meet general eligibility requirements. After the energy performance has been evaluated and assigned a benchmarking score, the ENERGY STAR Benchmarking Tool may produce a Statement of Energy Performance. A benchmarking score of 75 or higher as documented on the Statement of Energy Performance demonstrates that the building has met the energy performance criteria for award of the ENERGY STAR Label.

To be eligible for the ENERGY STAR Label, a building also must demonstrate compliance with current industry standards for indoor environment. This requires the on-site professional evaluation of control of indoor air pollutants, ventilation, thermal comfort, and lighting levels. The Statement of Energy Performance documents compliance with these criteria and is stamped and signed by the licensed building professional (currently licensed Professional Engineers only). Note that while a draft Statement of Energy Performance may be produced after benchmarking a building, it is not considered official until stamped and signed by a licensed Professional Engineer.

Once a building meets the energy and indoor environmental performance criteria, a Sponsor may nominate the building for award of the label. This is accomplished by downloading, customizing, signing, and returning a Letter of Agreement to EPA. Through this letter, the Sponsor agrees to maintain public confidence in the Label by verifying submitted building data (if requested) and adhering to logo usage guidelines. A Sponsor may be any authorized representative of the owner capable of exercising the operational and financial control of the building necessary to execute and uphold the Label agreement. For example, a Sponsor could be the building owner, manager, developer, facility manager, asset manager, leasing agent or broker, investor, or service provider (utility, ESCO, etc.). The signed letter and official Statement of Energy Performance are then mailed to this address (no photocopies or faxes, please):

ENERGY STAR Label for Buildings  
US Environmental Protection Agency (6202J)  
1200 Pennsylvania Avenue, Washington, DC 20460  
Hotline: 1-888-782-7937 (1-888-STAR YES)

Once the application is received, reviewed, and accepted by EPA, the building is awarded ENERGY STAR certification and a bronze plaque. Basic building information is posted to the ENERGY STAR Registry of Buildings and may be supplemented by the applicant with additional information if desired. In the future, non-identifying information on certified buildings (building space and energy use data only) will be posted to the Research Database to provide statistical information to the public about the ENERGY STAR Label for Buildings initiative.

**Note:** PEs are encouraged to use the Statement of Energy Performance for purposes other than applying for the ENERGY STAR Label. The Statement of Energy Performance, once signed and stamped by a licensed PE, becomes part of the building's permanent documentation and may be

used in business transactions involving the building. As such, the Statement of Energy Performance can be generated for any eligible building regardless of benchmark score.

## **7. Appendices**

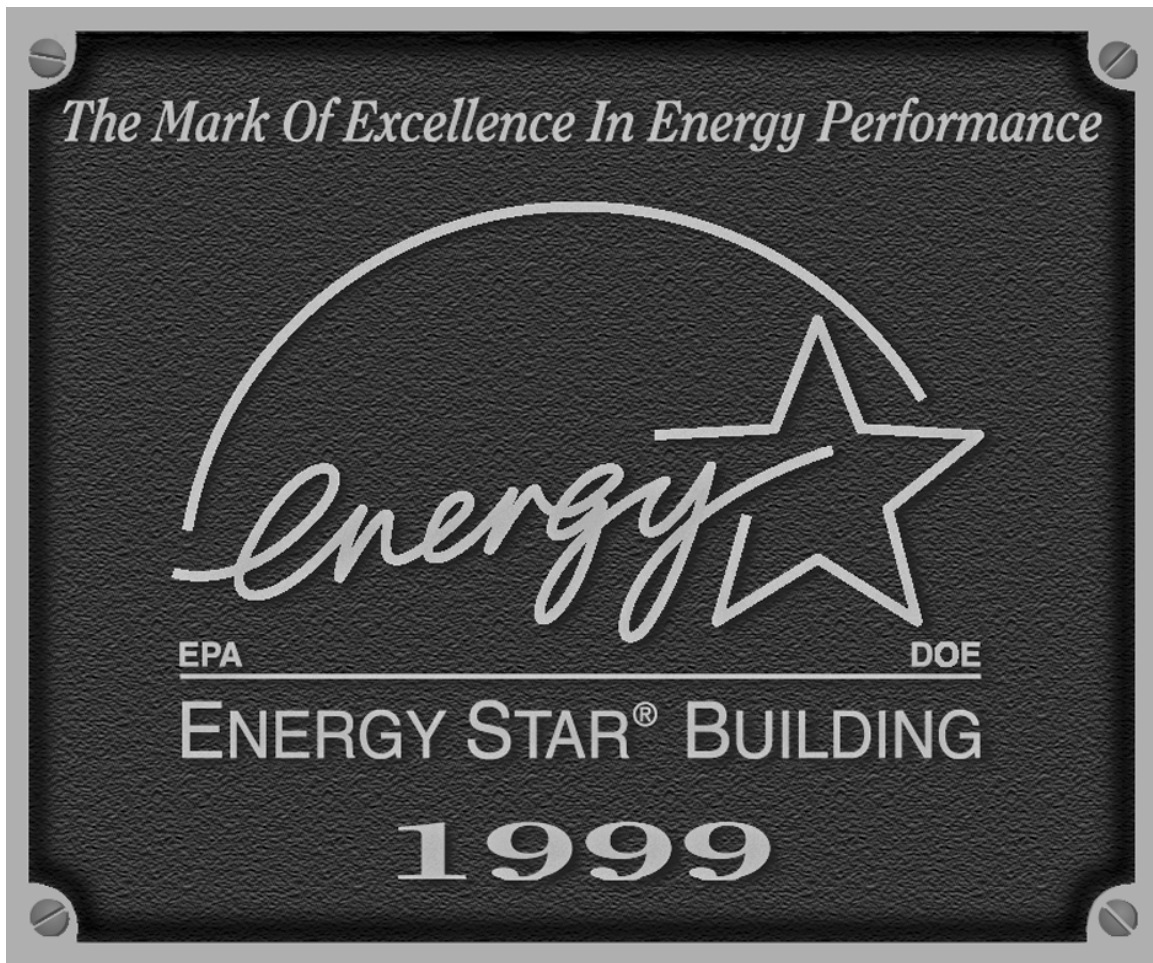
Note: the references in *italics* are to locations on the ENERGY STAR Label for Buildings web site where these documents can be found.

**7.1 Eligibility Rules**—*ENERGY STAR Benchmarking Tool and Supporting Documents*

**7.2 Definitions**—*ENERGY STAR Benchmarking Tool, Instructions and Definitions*

**7.3 PDF samples of blank Statement of Energy Performance** (*Statement of Energy Performance and Benchmarking Tool*) **and Letter of Agreement** (*Benchmarking Tool*)

**7.4 Label plaque**



Each building label is approximately 12 inches wide by 10 inches high by 3/8 inch deep, and weighs approximately 10 lbs. It will be mounted with four #10 1/4" brass screws (included with plaque). A drill bit (size #25) that is intended for the particular wall type where the plaque will be placed (e.g., a masonry bit for concrete or stone) should be used to drill a hole 1 1/2 inches deep into the wall surface. For a solid wall (e.g., brick, concrete block, or stone), a plastic or a lead anchor should be used along with the screw to ensure a good hold.

For a wood wall, the screw should be inserted through the plaque directly into the wood.

For a hollow wall, the screw should be inserted through the plaque and held in place by a hollow wall anchor.

### **7.5 List of Frequently Asked Questions—FAQs**

<http://www.epa.gov/buildings/label/html/fags.html>

**7.6 Help Line phone and e-mail numbers**—1-888-STAR YES and [energystarbuildings@epa.gov](mailto:energystarbuildings@epa.gov)

### **7.7 BAQ guidance from EPA IAD**

*Building Air Quality: A Guide for Building Owners and Facility Managers*, jointly published by EPA and the National Institute of Occupational Safety and Health.

<http://www.epa.gov/iaq/base/bagtoc.html>

EPA publication #400/1-91/033; DHHS (NIOSH) publication #91-114

The *Building Air Quality Guide* provides practical suggestions on preventing, identifying, and resolving indoor air quality (IAQ) problems in public and commercial buildings. The guide details factors affecting indoor air quality; describes how to develop an IAQ profile of building conditions and create an IAQ management plan; describes investigative strategies to identify causes of IAQ problems; and provides criteria for assessing alternative mitigation strategies, determining whether a problem has been resolved, and deciding whether to consult outside technical specialists. Other topics include key problem-causing factors; air quality sampling; heating, ventilation, and air conditioning systems; moisture problems; and additional sources of information.

*Building Air Quality Action Plan*, jointly published by EPA and the National Institute of Occupational Safety and Health; co-sponsored by the International Facility Managers Association.

<http://www.epa.gov/iaq/base/actionpl.html>

EPA publication #402-K-98-001; DHHS (NIOSH) Publication #98-123

*Building Air Quality Action Plan* (BAQ Action Plan) meets the needs of building owners and managers who want an easy-to-understand path for taking their buildings from current conditions and practices to successful institutionalization of good IAQ management practices without increasing the amount of work or cost of maintaining their buildings. The BAQ Action Plan follows 8 logical steps and includes a 100-item Checklist that is designed to help verify implementation of the Action Plan.

To use the BAQ Action Plan effectively, you must have a thorough understanding of the concepts and practices of managing IAQ, an understanding that can be gained from a thorough reading of *Building Air Quality: A Guide for Building Owners and Facility Managers*. In addition, there is extensive internal referencing of this BAQ Action Plan to the original *Building Air Quality Guide*, making it helpful and easy to use both documents together.

*Office Building Occupants Guide to Indoor Air Quality*, EPA Office of Air and Radiation (OAR), Indoor Environments Division (6604J).

<http://www.epa.gov/iaq/pubs/occupgd.html>

EPA-402-K-97-003, October 1997

This guide is intended to help people who work in office buildings learn about the roles of building managers and occupants in maintaining good indoor air quality.

## **7.8 ASHRAE/IESNA Standards**

The following standards are available from the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., (ASHRAE), Publication Sales Department, 1791 Tullie Circle, NE, Atlanta, GA 30329:

- ANSI/ASHRAE Standard 52.1-1992, *Gravimetric and Dust Spot Procedures for Testing Air Cleaning Devices used in General Ventilation for Removing Particulate Matter*
- ANSI/ASHRAE Standard 55-1992, *Thermal Environmental Conditions for Human Occupancy*
- ANSI/ASHRAE Standard 62-1989, *Ventilation for Acceptable Indoor Air Quality*

The following standard is available from the Illuminating Engineering Society of North America (IESNA), 120 Wall Street, 17th Floor, New York, NY 10005:

- IESNA, *Lighting Handbook: Reference & Application*, 9<sup>th</sup> Ed.